REMARKS

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 1-2, 4-5, and 7-17 are pending. No claims are added, amended or canceled. Therefore, no new matter is introduced.

In the outstanding Office Action, Claims 1-2, 4-5, 7-9 and 12-17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Eberbach (U.S. Patent No. 4,885,782) in view of Fujita (U.S. Patent No. 5,812,685) and Rhee (U.S. Patent No. 5,805,715); Claim 10 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Eberbach, Fujita and Rhee in further view of Packard (U.S. Patent No. 7,035,417); and Claim 11 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Eberbach, Fujita, Rhee and Hirade (U.S. Patent No. 7,119,267).

Initially, Applicant's gratefully acknowledge the courtesy of Examiner Monikang in holding a personal interview with Applicants' representative on December 2, 2010. During the interview the outstanding issues in this case were discussed as described below and in the Interview Summary, which the Examiner has made of record. Though Examine Monikang acknowledged the differences between the applied art and the pending claims, no agreement was reached pending further search and consideration.

The rejection of Claims 1-2, 4-5, 7-9 and 12-17 as being unpatentable over Eberbach, Fujita and Rhee is respectfully traversed.

Claim 1 is directed to an audio signal processing apparatus adapted for delivering an audio signal to a speaker system that includes:

> a frequency dividing filter configured to output portions of a preprocessed audio signal, input thereto, as separate frequency components;

> at least two drive units, which are divided or separated by frequency band, configured to receive the separate frequency components output from the frequency dividing filter;
>
> an FIR filter configured to generate the preprocessed audio signal from a filtered signal by correcting a shift between phases of respective sound waves radiated from respective drive surfaces of the at least two drive units of the speaker system caused by relative physical locations of the respective drive surfaces, the FIR filter having coefficients corresponding to an overall inverse impulse response of the entire speaker system; and
>
> a first filter configured to filter at least one input signal to generate the filtered signal, the first filter supplying the filtered signal to the FIR filter, the first filter having a transmission characteristic *to localize a sound image origin at arbitrary positions*. (Emphasis added.)

Thus, Claim 1 defines an audio signal processing apparatus whose first filter has a transmission characteristic that localizes the origin of the sound image at arbitrary positions. It is believed that none of the references cited, whether taken alone or in combination, discloses or suggests these features.

As noted in previous responses, Eberbach describes a loud speaker driver that compensates for relative positioning of a high frequency driver with respect to a low frequency driver using a cross over circuit (28) and a delay (30) to provide wide-angle dispersion of sound while maintaining accurate phase response.[1] As acknowledged on pages 3-4 of the outstanding Office Action, Eberbach fails to disclose or suggest the claimed FIR filter and the claimed first filter.

Fujita describes a polyhedron speaker system that reproduces sound in a spherical pattern and includes a DSP (6) to implement a digital filter to correct distortion inherent in each of the individual speakers.[2] The outstanding Office Action, however, acknowledges on page 4 that Eberbach in view of Fujita fails to disclose or suggest the claimed first filter. To

[1] Eberbach at column 1, lines 18-45 and column 3, lines 34-45; see also Figures 2-3.
[2] Fujita at column 5, lines 34-58 and column 6, lines 19-37; also Figure 4.

remedy this deficiency, the outstanding Office Action combines Eberbach and Fujita with Rhee.

Rhee describes a method of compensating audio signal distortion by exploiting the characteristics of the human ear.[3] Specifically, Rhee describes that because most acoustic equipment converts electrical signals into acoustic signals using mechanical vibration, the electrical signal is distorted by the transfer function of the acoustic equipment.[4] To compensate for this distortion, Rhee describes dividing the audible frequency band into multiple sections and assigning an FIR filter portion to each section.[5] Rhee also describes that the FIR filter in the upper frequency band has a lower frequency resolution than the FIR filter assigned to the lower frequency band because the human ear is more adept at discerning low frequencies than high frequencies.[6] Thus, Rhee describes that the distortion compensation can be tailored to match the auditory characteristics of the human ear while minimizing the number of overall filter taps used in the FIR filters that compensate for the distortion.[7]

However, Rhee does not describe that the FIR filters (43, 53) process the audio signal so that the sound image origin is set at the ear of the listener. Instead, Rhee only describes compensating for distortion introduced by the transfer function of the acoustic equipment by exploiting the characteristics of the human ear.[8] In other words, Rhee merely describes a system of compensating distortions so that a human listener does not perceive the distortion. Nowhere, however, does Rhee describe that the FIR filters (43, 53) process the audio signal so that the sound image origin is located at the listener's ears, i.e. that the sound image appears to emanate from the listener's ears. In fact, such a reading of Rhee would be absurd.

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[3] Rhee at column 3, lines 39 - column 4, line 3.
[4] Rhee at column 3, lines 43-47.
[5] Rhee at column 4, lines 26-48.
[6] Rhee at column 3, lines 50-67 and column 4, lines 1-8.
[7] Rhee at column 2, lines 10-20.
[8] Rhee at column 2, lines 10-20 and column 3, line 49 column 4, line 8.

Conversely, Claim 1 recites a first filter configured to filter at least one input signal to generate the filtered signal where the first filter has a transmission characteristic to localize a sound image origin at arbitrary positions. Therefore, Rhee fails to disclose the claimed first filter and does not cure the above-noted deficiencies in Eberbach and Fujita. Accordingly, no combination of Eberbach, Fujita and Rhee describes every feature recited in Claim 1, and Claim 1 is believed to be in condition for allowance, together with any claim depending therefrom.

Moreover, Claim 4, Claim 16 and Claim 17 recite substantially similar features to those recited in Claim 1 and are believed to be in condition for allowance for substantially similar reasons, together with any claim depending therefrom. Accordingly, it is respectfully requested that the rejection of Claims 1-2, 4-5, 7-9 and 12-17 under 35 U.S.C. § 103(a) be withdrawn.

As all other rejections of record rely upon Rhee for describing the above-distinguished features, and Rhee does not disclose or suggest the above-distinguished features, alone or in combination with any other art of record, it is respectfully submitted that a *prima facie* case of obviousness has not been presented. Accordingly, it is respectfully requested that the rejection of Claims 10-11 under 35 U.S.C. § 103(a) be withdrawn.

For the reasons discussed above, no further issues are believed to be in outstanding in the present application, and the present application is believed to be in condition for formal allowance. Therefore, a Notice of Allowance for Claims 1-2, 4-5 and 7-17 is earnestly solicited.

Should, however, the above distinctions be found unpersuasive, Applicants respectfully request that the Examiner provide an explanation via Advisory Action under M.P.E.P. § 714.13 specifically rebutting the points raised herein.

Respectfully submitted,

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 08/09)

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, L.L.P.

Bradley D. Lytle
Attorney of Record
Registration No. 40,073

Aldo Martinez
Registration No. 61,357